Chapter 2
When the Market Wins Over Research and Higher Education

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„*The market swallows up science*" (*Die Wirtschaft schluckt die Wissenschaft*…) is the title of an article by Ralf Leonhard in the German National daily newspaper "Tageszeitung" of 8 January 2014 in which the author reports on the integration of the Austrian Ministry for Science as part of the Ministry for Economic Affairs. On the web page of "Science Management online" (*Wissenschaftmanagement online*"), one can read the following introductory words by André Lottmann from the Institute for Research Information and Quality Assessment (Institut für Forschungsinformation und Qualitätssicherung) (Free translation, see Footnote[1])

> "With more autonomy, deregulation, worldwide competitive organisation and a distribution of funds subjected to achievements, the scientific system has considerably gained in autonomy. But are higher education and research institutions by now actually free from state control?"

On the EU web page, Horizon 2020, one of the largest EU funded Research and Innovation Programme over the coming 7 years (2014–2020), advertises its main goal as follows:

> The EU Framework Programme for Research and Innovation will be complemented by further measures to complete and further develop the European Research Area. These measures will aim at breaking down barriers to create a genuine single market for knowledge, research and innovation.

These quotes which speak for a growing marketing trend in the world of research and higher education lead to some questions I want to raise here:

[1]Mit einem Mehr an Autonomie, Deregulierung, wettbewerblicher Organisation und leistungsorientierter Mittelverteilung hat die Selbststeuerung im Wissenschaftssystem in den letzten Jahren nochmals deutlich an Fahrt gewonnen. Aber sind Hochschulen und Forschungseinrichtungen inzwischen wirklich völlig losgelöst von staatlichen Direktiven?

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(1) What do higher education and research institutions gain in being freed from state control?
(2) Can higher education and research institutions be evaluated by means of marketing parameters?
(3) Is the short-term timescale of markets compatible with the long-term timescale of research and education over generations?
(4) In the long run, is research predictable enough to be evaluated and funded according to the short-term results it is expected to produce?

Since mathematics is the topic I am most familiar with, let me quote two mathematicians. The first one is taken from a scientific article by Eugene Wigner (1902–1995) published in 1960. I have added the adjective "***unpredictable***" to the title for reasons that will become clear from the content of the quote:

> **The Unreasonable and Unpredictable Effectiveness of Mathematics in the Natural Sciences**
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> The first point [Eugene Wigner raises] is that mathematical concepts turn up in entirely unexpected connections [hence the adjective "unpredictable" I added]. Moreover, they often permit an unexpectedly close and accurate description of the phenomena in these connections. Secondly, just because of this circumstance, and because we do not understand the reasons of their usefulness, we cannot know whether a theory formulated in terms of mathematical concepts is uniquely **appropriate**. We are in a position similar to that of a man who was provided with a bunch of keys and who, having to open several doors in succession, always hit on the right key on the first or second trial. He became sceptical concerning the uniqueness of the coordination between keys and doors.

The second quote is taken from a speech in 2000 at the Millennium Meeting in Paris by a Field medallist (the equivalent of the Nobel prize) Timothy Gowers.

> **The importance of mathematics (T. Gowers)**
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> ....
>
> Taken as a whole, then, mathematics is undeniably important. However, a cost-cutting finance minister will notice a gap in the above argument; might it not be possible to achieve the same benefits more cheaply? If the benefits of mathematics come from teaching a few breakthroughs, while most mathematicians get on with their interesting but useless research, then why not cut the research funding to the useless areas and just support the teaching and the more practically oriented mathematics? One of my main objectives today is to expose the fallacy, or rather fallacies, that would lie behind such a proposal.
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> The first one is the idea that it is possible to identify the areas of mathematics that will turn out to be useful. In fact, it is notoriously hard to predict this, and the history of mathematics is littered with examples of areas of research that were initially pursued for their own sake and later turned out to have a completely unexpected importance. A […] fundamental example is the non-Euclidean geometry of Gauss, Bolyai and Lobachevsky, which is internally consistent despite such apparently paradoxical phenomena as the existence of triangles with angles not adding to 180 degrees. This paved the way for Riemannian geometry, which seemed to be an example of pure mathematics par excellence until it turned out to be exactly what Einstein needed for his general theory of relativity.

More than a decade later and in spite of such warnings, scientific research and higher education in Western Europe seem strongly steered by a short-sighted cost-cutting policy.

Let me name a few examples of whole research departments or institutes threatened with closure in the Netherlands, Austria and England. These accounts are based on information found on the Web.

- The VU (*Vrije Universiteit*) University Amsterdam, which like other universities in the Netherlands, suffers from recurrent financial underfunding, decided in 2011 to close down the geometry section in pure mathematics allowing with this decision for termination of four tenured positions and for topics like algebraic K-theory and general/geometric topology to cease to exist in the Netherlands. A petition signed by many mathematicians was not enough to prevent this closure.
- In October 2010, the Erwin Schrödinger Institute—a research institute located in Vienna, Austria, whose aim is to stimulate cross-fertilisation between mathematics and physics and which used to receive its basic funding from the Austrian Federal Ministry of Science and Research—was informed—without prior warning—that its funding by the Austrian Ministry of Science would be terminated effective 1 January 2011. Due to the strong objections of the international scientific community, this decision was reconsidered, resulting in the creation on 1 June 2011 of a "Forschungsplattform" (Research Platform) by the University of Vienna under the name "Erwin Schrödinger International Institute for Mathematical Physics". The Ministry of Science has promised funding for the new Forschungsplattform until 2015.
- In 2010, Middlesex University in London announced the closure of its philosophy department because the department was judged by the university to be not financially sustainable and despite the fact that Philosophy had been the highest ranking department in the university's latest Research Assessment Exercise (RAE) in 2008. An international campaign of support was organised with prestigious philosophers, and many others expressing their strong disapproval and articles condemning the decision appeared in the national press. Students protested actively on campus and elsewhere for the restitution of the department. In early June 2010, it was announced that the department's postgraduate component, the CRMEP, was to be transferred to Kingston University, but the undergraduate programme was still to be phased out.
- More recently in 2016, at the University of Leicester,[2] the 21 permanent research active staff members of the mathematics department were to reapply for their jobs in a competitive process, in view of sieving out 6 among the "lowest performers". Those "lowest performers" who would then be considered for "redeployment" are evaluated on their "performances" such as research grants,

[2]This information is taken from Tim Gowers' blog https://gowers.wordpress.com/2016/09/15/in-case-you-havent-heard-whats-going-on-in-leicester/.

research outputs, teaching feedback, and "the ongoing and potential for continued career development and trajectory".

Let me now describe the situation in France, which I am most familiar with.

- The **Centre national de la recherche scientifique** (**CNRS**) (National Center for Scientific Research) founded in 1939 and which lies under the auspices of the ministry of research was one of the largest public research organisations in Europe dedicated to funding fundamental research. The recently (in 2005) founded National Research Agency (ANR), initially planned on a short-term basis but which has since then turned into a permanent public agency, presently acts in France as an important alternative funding source to the CNRS. It funds research projects on a short-term basis (typically 2–4 years) on the grounds of their scientific excellence and their potential applications. The ANR has been steadily growing at the expense of the CNRS which is struggling to find its place in this new panorama. The relatively transparent peer-reviewing system traditionally implemented by the CNRS has been replaced by the rather opaque evaluation system of the ANR which has met a number of criticisms and led to some frustration among scientists. The long-term laboratory or research team funding policy of the CNRS is being superseded by the short-term project-based individual (piloting a research group) funding of the ANR, bringing colleagues to compete against each other instead of joining forces for the benefit of their department.
- As for higher education, a new law for universities was passed in 2008 called "*Freedom and responsibilities for universities*" (Libertés et responsabilités des universités) which has put more power in the hands of the university presidents enabling them to hire staff, to buy, sell or let out university premises and grounds, without any state intervention… this on paper since in many cases, the financial means provided by the state to the universities turned out to be far too low to implement such a self-governing policy. This has led to uneven competition among the universities, privileging the largest ones and making it hard for the smaller ones to preserve their research teams and not turn into higher education US-type colleges. Breaking with a long-lasting tradition of free and state governed higher education in France, universities are now tempted to introduce university entrance fees and turn to private sponsors to compensate for the lack of state funding. Universities advertise all kinds of fancy master studies to attract students, thereby increasing their number and hence their funds.

Germany has long adopted a short-term project-based funding—so-called *Drittmittel*, third-party funding—policy with funding essentially (but not only) emanating from the very influential and respected private agency "Deutsche Forschungsgemeinschaft" whose evaluating system is based on peer reviewing. On all levels, whether university, department or on an individual level, fund-raising has become a central criterium for excellence and as is the case in France, short-term project funding is superseding the long-term funding of universities. Gerhard Vogt—treasurer of the Nord Rhein-Westfalen region—reports in the February 2014

issue of the Magazine "*Forschung und Lehre*" edited by the *Humboldt-Stiftung* that project funding at universities now reaches an average of 24% (and up to 40% for some universities) and that an average of 26% of the university staff is paid on project funding funds.

More and more does one read critical analyses of the third-party funding system. Stefan Kühl, a sociologist at the university of Bielefeld, in his contribution "*Abschied von der Belohnnung guter Pläne*" (farewell to future project funding) to this same issue of the magazine "*Forschung und Lehre*" and in an article in the January 8th issue of the German daily newspaper Tageszeitung "*Mehr forschen statt dichten*" pleads for a prize system on achieved results rather than an evaluation on projects yet to be realised.

To conclude, based on my personal experience as professor in France and Germany, I want to mention some of the pitfalls of the marketing trend in today's research policies:

- Short-term projects with concrete applications can be favoured over long-term fundamental research projects with yet unpredictable applications;
- Fashionable topics can be favoured over less fashionable ones, which nevertheless could prove to be very useful in the long run;
- The pressure to produce according to quantifiable parameters such as the number of publications, the impact factor can encourage quantity at the expense of quality, and
- Academics turn into research managers, managing research teams and administrating funding, rather than actually producing research.

This at the cost of an invaluable freedom of thought indispensable to reach any deep result. Carrying out research freely has turned into a huge challenge and sometimes impossible task. Institutions such as the CNRS in France and the Academy of Science in Ukraine which used to seem invincible have become vulnerable; yet they are the fortresses which used to ensure the long-term future of fundamental science.

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nochmals deutlich an Fahrt gewonnen. Aber sind Hochschulen und Forschungseinrichtungen inzwischen wirklich völlig.

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